



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of

BEGG

Atty. Ref.: 34-125

Serial No. 10/812,917

TC/A.U.: 3729

Filed: March 31, 2004

Examiner: A. Tugbang

For: MANUFACTURE OF SHIM WINDINGS

October 10, 2007

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 C.F.R. § 41.37(c)

Sir:

Applicant has appealed to the Board of Patent Appeals and Interferences (Notice of Appeal filed August 10, 2007) from the last decision of the Examiner (Final Office Action dated February 15, 2007 and Advisory Action dated June 4, 2007). An appeal brief pursuant to 37 C.F.R. § 41.37(c) is now presented.

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(I) REAL PARTY IN INTEREST

The real party in interest is Tesla Engineering Limited, a British corporation of the United Kingdom.

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(II) RELATED APPEALS AND INTERFERENCES

The appellant, the undersigned, and the assignee are not aware of any related appeals, interferences, or judicial proceedings (past or present), which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(III) STATUS OF CLAIMS

Claims 1-10 are pending. Claims 1-4, 6, and 7 have been rejected. Claims 5 and 8-10 were withdrawn from consideration by the Examiner, there allegedly being no allowable generic or linking claim, even though Applicant has traversed the outstanding restriction requirement three times.¹ The rejections of claims 1-4, 6, and 7 are being appealed. No claims have been substantively allowed.

¹ A restriction requirement was issued in this case, and the undersigned provisionally elected Invention I, initially comprising claims 1-4 drawn to a process of making an electrical coil, in an Amendment dated August 3, 2006 in which claims 6-10 also were added. An Office Action mailed on February 15, 2007 appears to group claims 6 and 7 with claims 1-4.

In case the Board reviews the restriction requirement as an appealable issue, Applicant notes that the Examiner relies on MPEP § 2113. However, MPEP § 2113 actually relates to patentability considerations -- not to proper restriction practice. Furthermore, even when patentability considerations under 35 U.S.C. § 103 are at issue, MPEP § 2113 specifically requires that:

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding “interbonded by interfusion” to limit structure of the claimed composite and noting that terms such as “welded,” “intermixed,” “ground in place,” “press fitted,” and “etched” are capable of construction as structural limitations).

Accordingly, contrary to the Examiner’s assertion in the Final Office Action (which is reiterated to some extent in the Advisory Action), it is true that the product of the process claims here at issue can only be made by the claimed process of the respective parent claims. The Examiner’s assertion in the Final Office Action that this argument is not “persuasive because the final structure of the product claims in Group I, whether this includes shared [sic] sheared edges of the coil pattern or not, is not limited to the process steps recited in Group II” is not understood. Clearly, the structure implied by the process steps in a parent process claim does limit the claimed structure of the product claims 5 and 10 (Group I). Indeed, the section of the MPEP cited by the Examiner (i.e., § 2113) actually supports the Applicant’s argument.

The Examiner’s assertion in the Final Office Action that “patterning by coating can generate to some degree, sharp edges, depending on how the pattern is coated” is not supported by any factual showing and, in any event, is either irrelevant or supports the Applicant’s argument. That is, even if it is true that coating can generate to some degree sharp edges, depending upon how the pattern is coated, it is still clear that the resulting product is different in structure from the product now being claimed which can only be created by the process of punching or cutting.

Thus, Applicant submits that the restriction requirement is inappropriate. In any case, claim 1 is generic to claim 5 and claim 6 is generic to claims 8, 9, and 10. Accordingly, once these generic claims 1 and 6 are found allowable, it will be understood that the withdrawn claims should also be allowed.

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(IV) STATUS OF AMENDMENTS

An Amendment Under 37 C.F.R. § 1.116 was filed on May 15, 2007 (obviating a formalities-based rejection to claim 7). An Advisory Action mailed June 4, 2007 indicated that the Amendment of May 15, 2007 would be entered for purposes of appeal. Accordingly, the current status of the claims is the same as that presented in the Amendment Under 37 C.F.R. § 1.116 filed May 15, 2007.

(V) SUMMARY OF CLAIMED SUBJECT MATTER

Each independent claim, each dependent claim argued separately, and each claim having means plus function language is summarized below including exemplary reference(s) to page and line number(s) of the specification.

A. Introduction

The invention of the claims relates to the manufacture of coils for use in magnetic resonance imaging spectroscopy (MRIS). MRIS systems generally comprise a plurality of cylindrical concentric coils located around a region within which a patient can be located. The coils include an outermost DC coil that is used to provide a strong constant magnetic field, an inner radio frequency (RF) coil arrangement that is arranged concentrically within the DC coil, and a gradient coil assembly that is located between the RF coil and the outer DC coil. The presence of a patient in the magnetic field may distort the main magnetic field, making it insufficiently uniform for imaging or spectroscopic measurements. A known way of counteracting this effect is by providing multi-turn electrical windings known as shim coils and driving DC electrical currents through those windings. The shim coils can also be used to correct intrinsic inhomogeneities of the super-conductive magnet itself. The invention of the claims relates to techniques for forming a shim coil for use in MRIS by cutting or punching in a sheet of electrically conductive material the required coil pattern. The pattern can be punched using a CNC punch or stamping machine.

B. Independent Method Claim 1

Independent method claim 1 relates to a method of forming an electrical MRIS shim coil (page 3, lines 9-10; page 4, lines 9-10; Figs. 1-4). The method comprises forming a required coil pattern in a sheet of electrically conductive material by cutting or punching (page 3, lines 10-11; Figs. 1-4).

C. Dependent Method Claim 4

Dependent method claim 4 adds further features to this basic method of claim 1. Claim 4 requires that the pattern is cut using a laser or a water jet (page 3, line 13).

D. Independent Method Claim 6

Independent method claim 6 relates to a method of making an electrical MRIS shim coil (page 3, lines 9-10; page 4, lines 9-10; Figs. 1-4). Plural adjacently positioned MRIS shim coil windings are created by cutting a continuous sheet of electrically conductive material along spaced apart paths, which windings are physically retained in adjacent as-cut positions by an insulating substrate adhered to said conductive material (page 4, lines 9-13; Figs. 1-4). The cutting step includes removal of conductive material along at least one cutting path by a process including at least one of: punching, stamping, laser beam and water jet cutting processes (page 4, lines 12-16; Figs. 1-4).

E. Dependent Method Claim 7

Dependent method claim 7 adds further features to this basic method of claim 6. Claim 7 specifies that the cutting comprises a first cutting step wherein bridges of material are left along the cutting paths to physically maintain the adjacent as-cut positions of the MRIS shim coil windings while said insulating substrate is adhered

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thereto, followed by a second cutting step wherein said bridges are cut off to completely form an electrical separation between the adjacent winding conductors thus formed (page 4, line 12 to page 5, line 2; Figs. 1-4).

(VI) GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-4 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Henke (U.S. Patent No. 1,801,214).

Claims 1-4 have been rejected as allegedly being made “obvious” under 35 U.S.C. § 103(a) over Applicant’s Admitted Prior Art (AAPA) in view of Henke.

Claims 6 and 7 have been rejected as allegedly being made “obvious” under 35 U.S.C. § 103(a) over Senda et al. (U.S. Patent No. 5,197,170), Japanese Patent Publication JP 2000-223318, and the AAPA.

(VII) ARGUMENT

Claims 1-4 are neither anticipated by Henke under 35 U.S.C. § 102, nor “obvious” over Applicant’s Admitted Prior Art in view of Henke.

Claims 1-4 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Henke (U.S. Patent No. 1,801,214). Alternatively, claims 1-4 have been rejected as allegedly being made “obvious” under 35 U.S.C. § 103(a) over Applicant’s Admitted Prior Art (AAPA) in view of Henke. These rejections are respectfully traversed.

In making these rejections, the Examiner erroneously refuses to give patentable weight to the preamble of claim 1. The preamble of a claim should be given patentable weight, *inter alia*, when it is necessary to give life and meaning to the claim, and also when it is essential to pointing out the invention defined by the claims. As explained in greater detail below, such is the case with claim 1. Thus, the Examiner’s refusal to give it patentable weight is erroneous. Moreover, once the preamble is given patentable weight, it is clear that the rejections under Sections 102(b) and 103(a) cannot stand.

As explained in MPEP § 2111.02 and in cases cited therein, the claim preamble is supposed to be given weight whenever the preamble is necessary to give life, meaning, and vitality to the claim, or otherwise deemed essential to point out the invention defined by the claims. For example, in *Korpa v. Robie*, 187 F.2d 150, 152 (CCPA 1951), a preamble reciting “an abrasive article” was deemed essential to point out the invention defined by claims to an article comprising abrasive grains and a hardened binder and the process of making it. As the court there stated, “It is only by that phrase that it can be

known that the subject matter defined by the claims is comprised as an abrasive article. Every union of substances capable *inter alia* of use as abrasive grains and a binder is not an 'abrasive article.'" Therefore, the preamble served to further define the structure of the article produced in that case.

Furthermore, MPEP § 2111.02(I) requires that "any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation." More recent Federal Circuit cases are quoted (including a 1989 Federal Circuit case of *Corning Glassworks v. Sumitomo Electric USA, Inc.*, 868 F.2d 1251) to explain that the determination of whether preamble recitations are structural limitations can be resolved only on review of the entirety of the application "to gain an understanding of what the inventors actually invented and intended to encompass by the claim." Several other Federal Circuit cases to the same effect are quoted in the MPEP on this point.

Clearly, Applicant intended the preamble of claim 1 to be a limitation. As explained in considerable detail in the specification and again in Applicant's earlier submitted remarks of August 3, 2006 and May 15, 2007, for various reasons there was a prejudice in the art against making magnetic resonance imaging spectroscopic (MRIS) shim coil structures in the claimed manner in the prior art. Only because the Applicant recognized certain changes in the evolution of MRIS shim coil usage has it been discovered by the Applicant that forming the required MRIS shim coil pattern in a sheet of electrically conductive material by cutting or punching is actually a preferable method of construction (as opposed to prior art construction techniques which included, *inter alia*, etching, as noted in the specification).

Even if the preamble of claim 1 is improperly interpreted as a mere statement of intended use, the Examiner's refusal to give it patentable weight still would be improper in view of the MPEP § 2111.02(II) and Federal Circuit case law. For example, in *Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d 801, 808-09 (Fed. Cir. 2002), the Federal Circuit observed that "clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention. . . ." The MPEP approves of the notion that the "preamble may provide context for claim construction, particularly, where . . . that preamble's statement of intended use forms the basis for distinguishing the prior art in the patent's prosecution history." MPEP § 2111.02(II) (citing with approval *Metabolite Labs., Inc. v. Corp. of Am. Holdings*, 370 F.3d 1354, 1358-62 (Fed. Cir. 2004)).

The similarities between the prosecution of this application and the situations posited in the MPEP, *Catalina*, and *Metabolite* and are striking. Here, as explained above, it is clear that the Applicant intended the preamble of claim 1 to be a limitation. Furthermore, reliance on the preamble to define the claim and distinguish the prior art pervades the prosecution of this application. Indeed, the use of the preamble to define the claim and distinguish the prior art can be seen in the first three pages of specification, as well as throughout Applicant's Responses of August 3, 2006 and May 15, 2007. Thus, the preamble of claim 1 should be given patentable weight, even if it is interpreted merely as a statement of intended use.

It is not clear from the Advisory Action whether the Examiner continues to rely on *In re Hirao*, 535 F.2d 67 (CCPA 1976) for the proposition that the preamble need not be given patentable weight. To the extent that the Examiner maintains this position provided in the Final Office Action, it is noted that *In re Hirao* is inapplicable for several reasons. First, the portion of this opinion relating to claim preambles is merely dicta. Second, the USPTO in this instance was the one actually alleging that the preamble had to be given weight -- and was alleging that it had to be given weight in such a manner that it would broaden the scope of the claim. The CCPA in this context refused the USPTO's assertion that the preamble served to broaden the scope of the claim (thus making it more vulnerable to obviousness attacks). In that particular case, the CCPA found the preamble to merely recite the purpose of the process. Here, the preamble of claim 1 recites an important and integral part of the process. That is, Applicant's claim is directed to a method for forming an electrical MRIS shim coil -- not any other type or kind of coil -- and this limitation is both necessary to breath life and meaning into the in the claim and also essential to point out the invention defined by the claims.

When the proper patentable weight is given to the preamble of claim 1, it becomes clear that the rejections of Sections 102(b) an 103(a) should be reversed. First, with respect to the rejection under Section 102(b), clearly Henke does not disclose an MRIS shim coil -- nor any method for making such a coil. Accordingly, when claim 1 is properly construed, it is impossible for that claim to be anticipated by Henke. Thus, Applicant respectfully requests that this rejection under 35 U.S.C. § 102(b) be reversed.

Furthermore, with respect to the rejection under Section 103(a), since part of Applicant's Admitted Prior Art (AAPA) is conventional wisdom against the use of punching or cutting for forming MRIS shim coils, it is also clear that it would not be "obvious" within the meaning of 35 U.S.C. § 103 to have used any cutting or punching process of Henke in the making of an MRIS shim coil. To the contrary, it would have argued against the teaching of the prior art. Such is the antithesis of "obviousness" under 35 U.S.C. § 103. In a situation analogous to this Board's decision in *Ex Parte Crawford et al.*, Appeal 20062429, decided May 30, 2007, the only suggestion for combining teachings and suggestions of the fundamentally different and incompatible teachings of the AAPA and Henke as advanced by the Examiner uses the Applicant's "invention as a template through a hindsight reconstruction of [the] claims."

More particularly, the Examiner's comments provided in the Final Office Action and in the Advisory Action as to why one of ordinary skill in the art of making MRIS shim coils would have found it "obvious" to have adopted the Henke process reveals the Examiner's misunderstanding of MRIS shim coils. MRIS shim coils are not used with any magnetic core -- whether open or closed. Accordingly, the Henke teaching referenced by the Examiner at page 1, column 15-30 [sic -- page 1, lines 15-30] are completely inapplicable to the situation presented by an MRIS shim coil. Indeed, those skilled in the practice of making MRIS shim coils would find it odd to have any consideration whatsoever of a "closed magnetic core."

With respect to the recitations of the "problems" common between the AAPA and Henke and the "advantages" conferred by the alleged combination of the two listed in the

Final Office Action and repeated in the Advisory Action, Applicant notes that the Examiner offers only “mere conclusory statements . . . [rather than] articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Cf. In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Correspondingly, the Examiner appears either to ignore the litany of advantages of certain example embodiments of the instant invention over the AAPA provided on pages 5-6 of the original specification, or to assume without any specific factual support or underlying reasoning that the alleged combination will result in a similar set of such advantages.

As such, Applicant submits that one of ordinary skill in the art at the time of the invention having common sense would not have combined the prior art in the manner alleged by the Examiner. Thus, Applicant respectfully requests that the rejection of claims 1-4 under 35 U.S.C. § 103(a) be reversed.

Further, the Examiner’s continued refusal to give any patentable weight to the added limitations of claim 4 is also believed to be clearly erroneous. The Applicant has not “selected” punching as opposed to cutting. Claim 1 is generic to either cutting or punching. Claim 4 further limits the recitations of claim 1 by requiring (a) cutting and (b) cutting by use of a laser or a water jet. The Examiner’s refusal to consider these additional limitations of dependent claim 4 are believed to be erroneous. Once these additional limitations are considered, it is clear that there is no teaching or suggestion of this in the cited art relied upon for this ground of rejection.

Claims 6 and 7 are each not “obvious” over Senda, JP 2000-223318, and the AAPA.

Claims 6 and 7 have been rejected as allegedly being made “obvious” under 35 U.S.C. § 103(a) over Senda et al. (U.S. Patent No. 5,197,170), Japanese Patent Publication JP 2000-223318, and the AAPA. This rejection is respectfully traversed.

As already noted above, the AAPA referred to by the Examiner includes a specific prejudice not to go in the direction of Applicant’s claimed invention. Furthermore, both Senda and JP ‘318 are directed to the production of extremely small scale inductances formed on small chip-sized substrates suitable for use in printed circuit boards and the like. None of the cited prior art has anything whatsoever to do with methods for making much larger scale MRIS shim coils (except, of course, for the AAPA which teaches against use of Applicant’s claimed methods).

The Examiner’s reference to Senda’s coil as an electrical “shim” coil is without foundation. There is no teaching in Senda of any shim coil -- let alone an MRIS shim coil. Furthermore, the coil inductor patterns 16a and 16b depicted at Figures 3 and 5 (two sandwich layers of the laminated structure disclosed in Senda) are explicitly formed by photo etching methods and are thus specifically contrary to Applicant’s claims, which require cutting or punching of a coil pattern.

The Examiner’s allegation that items “1 or 15a or 15b” teach the cutting of a continuous sheet of electrically conductive material is not understood. Items 15a and 15b are clearly disclosed as insulating sheets (e.g., see col. 3, line 54). Item 1 is the entire substrate sandwich of encapsulated capacitors on which the further encapsulated inductor sandwich structures are to be formed.

The Examiner's reference to "adjacent as-cut positions" as somehow being found at Senda in Figure 3 and subsequently in Figure 7 of Senda is also not understood. The Senda process simultaneously forms six LC chips. All six are in one unitary structure until they are cut apart into individual chips as shown at Figure 7. However, the coil patterns 16a and 16b that are found sandwiched within the chip (on top of the capacitor substrate 1) are self-standing inductances in each of the 6 chips -- i.e., they are not related to one another in the various six portions of the composite structure during construction and certainly not after being completely cut apart as six separate chips like the one depicted in Figure 7 of Senda.

Indeed, the Examiner has recognized that Senda really only teaches photo etching for formation of the coil patterns 16a and 16b (citing to col. 4, lines 15-44). However, the Examiner alleges that photo etching has now somehow become "cutting." Not only is this erroneous on its face, it also contradicts the Examiner's earlier assertions made in the Office Action dated October 13, 2006, where the Examiner found that the product of Group I can be made by a materially different process, such as one the [*sic*:] that forms the required coil pattern by deposition and coating techniques, e.g., plating, CVD, etc., as opposed to cutting or punching of conductive material, as required by Group II."

With respect to claim 7, the Examiner purports to find a cutting step which leaves bridges of materials 18a as shown in Figures 4, 5, and 6. However, conductors 18a shown in these figures are actually conductive lead electrodes that are never removed but instead are always in place to form ultimate final connections between the filter circuit chip and a printed circuit or the like. It is true that these lead conductors are originally

formed in the composite six-pack as being sufficiently wide so that they still exist (*albeit* narrower) after the six-pack is cut apart into individual chips as depicted at Figure 7. Of course, this final cutting apart of the six-pack into individual chips has nothing whatsoever to do with maintaining adjacent as-cut positions of any shim coil winding (or any other winding for that matter), nor does it have anything to do with a second cutting step which then cuts the bridges apart so as to completely form electrical separation between adjacent shim coil windings. Indeed, all of the windings of any given one of the inductors in Senda is completely encapsulated within the chip shown at Figure 7. The photo etching process that produces the coil patterns 16a and 16b has nothing whatsoever to do with the cutting apart of the composite six-pack into individual chips -- including the cleaving of permanent lead electrodes 18b along the six-pack cleave lines.

The Examiner acknowledges that Senda does not mention that its inductor windings are "MRIS shim coil windings." Indeed, Senda also does not mention those inductors as being any form of "shim" coil (contrary to the Examiner's description elsewhere).

The Examiner also recognizes that Senda does not use a laser beam to form any of its conductive patterns or to cut apart any of the conductors that are used. For this admitted deficiency, the Examiner relies upon JP '318. Of course, the Examiner is correct in noting that the generic use of lasers for cutting metals is conventional and well known. However, insofar as the Examiner refers to JP '318 for teaching or suggesting printed inductances on a small chip as being any kind of "shim" coil that is in any way analogous to an MRIS shim coil, such an assertion is clearly erroneous.

The Examiner's comments concerning AAPA as somehow establishing it to be conventional to connect an MRIS shim coil winding "within the network" is not understood. While the small scale LC filters of Senda and/or JP '318 certainly are designed to be connected within a network (e.g., to act as low pass or high pass frequency selective filters or the like), they are not designed for the purpose of producing a magnetic field, *per se*. The Examiner's references to an "LC composite network" is also a bit unclear. So far as the undersigned can ascertain, the purpose of the coils in Senda and/or JP '318 is not to produce a magnetic field in a network but instead to provide suitable inductance/capacitance circuits for use as frequency selective filter circuits in a network of electronic components. Such is clearly very far field from the art of making (or using) MRIS shim coils.

Given the deficiencies of the prior art, the discrepancies in their actual teachings and the purposes for which the Examiner cites them, and the lack of any motivation to combine the references to result in the combination alleged by the Examiner, Applicant respectfully requests that the rejection of claims 6 and 7 under 35 U.S.C. § 103(a) be reversed.

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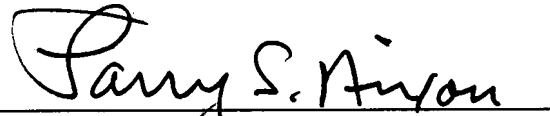
CONCLUSION

In conclusion it is believed that the rejections of at least claims 1-4, 6, and 7 are erroneous and should be reversed.

Respectfully submitted,

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(VIII) CLAIMS APPENDIX

1. A method of forming an electrical MRIS shim coil, said method comprising:

forming a required coil pattern in a sheet of electrically conductive material by cutting or punching.
2. A method as in claim 1 wherein the pattern is punched from the sheet.
3. A method as in claim 2 wherein the pattern is punched using a CNC punch or stamping machine.
4. A method as in claim 1 wherein the pattern is cut using a laser or a water jet.
5. An electrical MRIS shim coil made by the method of claim 1.
6. A method of making an electrical MRIS shim coil, said method comprising:

creating plural adjacently positioned MRIS shim coil windings by cutting a continuous sheet of electrically conductive material along spaced apart paths, which windings are physically retained in adjacent as-cut positions by an insulating substrate adhered to said conductive material,

said cutting step including removal of conductive material along at least one cutting path by a process including at least one of: punching, stamping, laser beam and water jet cutting processes.

7. A method as in claim 6 wherein said cutting comprises:

a first cutting step wherein bridges of material are left along the cutting paths to physically maintain the adjacent as-cut positions of the MRIS shim coil windings while said insulating substrate is adhered thereto followed by a second cutting step wherein said bridges are cut off to completely form an electrical separation between the adjacent winding conductors thus formed.

8. A method as in claim 6 wherein said cutting step creates one continuous spiral-like cut path in said continuous sheet of conductive material.

9. A method as in claim 6 wherein said cutting step creates plural parallel cut paths in said continuous sheet of conductive material to create opposing ends that are bent and electrically connected by forming the conductive material, and the supporting insulating substrate, into a closed shape.

10. An MRIS shim coil produced by the process of claim 6.

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(IX) EVIDENCE APPENDIX

None.

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(X) RELATED PROCEEDINGS APPENDIX

None.